

Abstract Submitted
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Evolution of the absolute value of the London penetration depth in single crystals of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ upon cobalt doping RYAN GORDON, NI NI, MAKARIY TANATAR, VLADIMIR KOGAN, SERGEY BUD'KO, PAUL CANFIELD, RUSLAN PROZOROV, Iowa State University and Ames Laboratory, NICHOLAI SALOVICH, RUSSELL GIANNETTA, University of Illinois at Urbana-Champaign — The absolute value of the London penetration depth, λ_0 , has been measured in single crystals of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ over a wide range of cobalt doping levels using a tunnel diode resonator (TDR) [1]. Normally, the TDR technique can only measure the relative change, $\Delta\lambda(T)$, but the absolute value is needed to construct $\lambda(T)$ and the superfluid density, $\rho_s=[\lambda_0/\lambda(T)]^2$, which can be compared to theory. A more elaborate approach in which the samples are coated with a thin film of Al allows for a direct estimate of λ_0 by using the same TDR apparatus [2]. The resulting doping-dependent $\lambda_0(x)$ as well as the calculated $\rho_s(T,x)$ curves will be discussed within current theoretical models. In particular, attention will be devoted to the effects of possible strong pair breaking predictions which state $\Delta\lambda \propto T^n/T_c^3$, with $n \approx 2$ [3]. [1] R. T. Gordon *et al.*, Phys. Rev. B **79**, 100506(R) (2009). [2] R. Prozorov *et al.*, Appl. Phys. Lett. **77**, 25 (2000). [3] V. G. Kogan, arXiv:0910.4728

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